

AMENDMENTS TO THE CLAIMS

1. (Original) A liquid injection system comprising a liquid syringe; and
a liquid injector; the liquid syringe including a cylinder member and a piston member slidably inserted into the cylinder member, and the liquid injector including a cylinder holding mechanism for receiving the cylinder member of the liquid syringe mounted removably thereon and a piston actuating mechanism for relatively moving the piston member with respect to the held cylinder member of the liquid syringe,
wherein the liquid injector comprises mount-detecting means for detecting contact and separation of the cylinder member when the cylinder member is mounted on and removed from the cylinder holding mechanism, respectively.
2. (Original) A liquid injection system according to claim 1, wherein the cylinder holding mechanism comprises:
a pair of left and right movable holders, each having an arc-shaped groove defined in an inner surface, to the groove of which a cylinder flange of the liquid syringe with its axis extending forwardly and rearwardly are removably engaged, and
a holder pivot support mechanism for pivotally supporting each of the movable holders for vertical angular movement between an open position in which the movable holders are open upwardly for allowing the cylinder flange to be inserted into the grooves and a closed position in which the cylinder flange is retained from left and right sides by the grooves.
3. (Currently amended) A liquid injection system according to claim 1—~~or~~—2, wherein the liquid syringes of various sizes are provided,
further comprising at least one cylinder adapter for allowing the cylinder holding mechanism to hold the liquid syringe having a size other than the maximum size,
wherein the cylinder holding mechanism directly receives the liquid syringe having the maximum size mounted thereon and the liquid syringe having a size other than the maximum size mounted thereon through the cylinder adapter, and
the cylinder adapter comprises an adapter body having an outer surface held by the cylinder holding mechanism and an inner surface holding the cylinder member and a

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contact-transfer member supported movably and moved to a position where the contact-transfer member is in contact with the mount-detecting means when the adapter body with the cylinder member mounted thereon is installed in the cylinder holding mechanism.

4. (Original) A liquid injection system according to claim 3, wherein the contact-transfer member is biased to a position where the contact-transfer member is not in contact with the mount-detecting means when the adapter body with the cylinder member not mounted thereon is installed in the cylinder holding mechanism.

5. (Currently amended) A liquid injection system according to claim 3 ~~or 4~~, wherein the cylinder adapter includes:

a pair of left and right movable holders, each having an arc-shaped groove defined in an inner surface, to the groove of which the cylinder flange of the liquid syringe with its axis extending forwardly and rearwardly are removably engaged, and

a holder pivot support mechanism for pivotally supporting each of the movable holders for vertical angular movement between an open position in which the movable holders are open upwardly for allowing the cylinder flange to be inserted into the grooves and a closed position in which the cylinder flange is retained from left and right sides by the grooves.

6. (Currently amended) A liquid injection system according to ~~any one of claims 3 to 5~~, wherein components of the cylinder adapter are made of a nonmagnetic material.

7. (Currently amended) A liquid injection system according to ~~any one of claims 1 to 6~~, wherein the liquid injector further includes a display panel for outputting as display the detection result of the mount-detecting means.

8. (Original) A liquid injection system according to claim 7, wherein the display panel is provided together with at least one of the cylinder holding mechanism and the piston actuating mechanism.

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9. (Currently amended) A liquid injection system according to ~~any one of~~ claims 1 to 8, wherein the liquid injector further includes drive control means for controlling the piston actuating mechanism to disable the operation thereof when the mount-detecting means detects no mount of the liquid syringe.

10. (Currently amended) A liquid injection system according to ~~any of~~ claims 1 to 9, wherein the liquid injector further comprises:

an imaging diagnostic apparatus for capturing an image of a patient to whom a liquid is injected from the liquid syringe; and

control means for controlling the imaging diagnostic apparatus to disable the operation thereof when the mount-detecting means detects no mount of the liquid syringe.

11. (Original) A liquid injector used for the liquid injection system according to claim 1, comprising:

a cylinder holding mechanism for receiving a cylinder member of the liquid syringe mounted removably thereon;

a piston actuating mechanism for relatively moving the piston member with respect to the held cylinder member of the liquid syringe; and

mount-detecting means for detecting contact and separation of the cylinder member when the cylinder member is mounted on and removed from the cylinder holding mechanism, respectively.

12. (Original) A cylinder adapter of the liquid injection system according to claim 3, comprising:

an adapter body having an outer surface held by the cylinder holding mechanism and an inner surface holding the cylinder member; and

a contact-transfer member supported movably and moved to a position where the contact-transfer member is in contact with the mount-detecting means when the adapter body with the cylinder member mounted thereon is installed in the cylinder holding mechanism.

13. (New) A liquid injection system comprising:

a first liquid syringe comprising a cylinder member and a piston member slidably inserted into the cylinder member; and

a liquid injector comprising a cylinder holding mechanism for receiving the cylinder member of the liquid syringe mounted removably thereon, and a piston actuating mechanism for moving the piston member relative to the cylinder member when the cylinder member is held by the cylinder holding mechanism;

wherein the liquid injector further comprises a switch that detects contact and separation of the cylinder member when the cylinder member is mounted on and removed from the cylinder holding mechanism, respectively.

14. (New) A liquid injection system according to claim 13, wherein the liquid injector further includes a computer for controlling the piston actuating mechanism to disable the operation thereof when the switch detects no mount of a liquid syringe.

15. (New) A liquid injection system according to claim 13, wherein the liquid injector further comprises:

an imaging diagnostic apparatus for capturing an image of a patient into whom a liquid is injected from the liquid syringe; and

a computer for controlling the imaging diagnostic apparatus to disable the operation thereof when the switch detects no mount of the liquid syringe.

16. (New) A liquid injector for use in the liquid injection system according to claim 13, comprising:

a cylinder holding mechanism for receiving a cylinder member of the liquid syringe mounted removably thereon;

a piston actuating mechanism for relatively moving the piston member with respect to the held cylinder member of the liquid syringe; and

a switch that detects contact and separation of the cylinder member when the cylinder member is mounted on and removed from the cylinder holding mechanism, respectively.

17. (New) A liquid injection system comprising:

a first liquid syringe comprising a cylinder member and a piston member slidably inserted into the cylinder member; and

a liquid injector comprising a cylinder holding mechanism for receiving the cylinder member of the liquid syringe mounted removably thereon, and a piston actuating mechanism for moving the piston member relative to the cylinder member when the cylinder member is held by the cylinder holding mechanism;

wherein the liquid injector further comprises mount-detecting means for detecting contact and separation of the cylinder member when the cylinder member is mounted on and removed from the cylinder holding mechanism, respectively.

18. (New) A liquid injection system according to claim 17, wherein the cylinder holding mechanism comprises:

a pair of left and right movable holders, each having an arc-shaped groove defined in an inner surface, the grooves of which are removably engaged by a cylinder flange of the liquid syringe; and

a holder pivot support mechanism for pivotally supporting each of the movable holders for vertical angular movement between an open position in which the movable holders are open upwardly for allowing the cylinder flange to be inserted into the grooves and a closed position in which the cylinder flange is retained from left and right sides by the grooves.

19. (New) A liquid injection system according to claim 17, further comprising a second liquid syringe having a smaller size than the first liquid syringe; and

a cylinder adapter for allowing the cylinder holding mechanism to hold the second liquid syringe;

wherein the cylinder holding mechanism directly receives the first liquid syringe mounted thereon and receives the second liquid syringe mounted thereon through the cylinder adapter; and

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the cylinder adapter comprises: an adapter body having an outer surface held by the cylinder holding mechanism and an inner surface holding the cylinder member; and a contact-transfer member that is supported movably and is moved to a position where the contact-transfer member is in contact with the mount-detecting means when the adapter body with the cylinder member mounted thereon is installed in the cylinder holding mechanism.

20. (New) A liquid injection system according to claim 19, wherein the cylinder adapter further comprises:

a pair of left and right movable holders, each having an arc-shaped groove defined in an inner surface, the grooves of which are removably engaged by the cylinder flange of the liquid syringe; and

a holder pivot support mechanism for pivotally supporting each of the movable holders for vertical angular movement between an open position in which the movable holders are open upwardly for allowing the cylinder flange to be inserted into the grooves and a closed position in which the cylinder flange is retained from left and right sides by the grooves.